Fact Sheet: The Oil Water Separator

How to select and maintain an oil water separator




King County
Department of
Natural Resources and Parks
Industrial Waste Program

April 2006

Mission Statement

The mission of the Industrial Waste Program is to protect the environment, public health, biosolids quality, and King County's regional sewerage system. We work cooperatively with our customers as we regulate industrial discharges, provide technical assistance, and monitor the regional sewerage system.

Topic overview

Introduction

For businesses that generate oily wastewater from use of petroleum products, an oil/water separator can be an effective and economical means to treat wastewater to an acceptable level for discharge to the King County sanitary sewer system. Because oil and water do not mix well, and as oil "floats" due to being lighter than water, effective treatment can be achieved if the correct oil-water separator is installed, routine maintenance is adhered to, and the separation of oil and water is not compromised by the excessive use of certain chemicals. This fact sheet is designed to provide information for businesses that currently have an oil-water separator or are considering the purchase of an oil-water separator.

What is an oil/water separator?

Standard baffle oil/water (O/W) separators are large-capacity, underground cement vaults installed between a drain and the connecting sewer pipe. These vaults are designed with baffles to trap sediments and retain floating oils. The large capacity of the vaults slows down the wastewater, allowing oil to float to the surface and solid material to settle out (Figure 1).

Another popular design is the coalescing plate separator (CPS), which businesses can install above or below ground. It has a smaller capacity and employs a series of oil-attracting plates. Oil droplets collect and float to the surface, where they can be skimmed off or removed mechanically (Figure 2).

Creating Resources from Wastewater

Who needs an oil/water separator?

Any business that plans to discharge oily or sediment-laden wastewater to the sewer must install, use and maintain an oil/water separator. Businesses that typically need oil/water separators include:

- **Quick-lube stations**
- **Transportation fueling facilities;**
- **Vehicle/heavy equipment repair; and**
- **Businesses using steam or pressure washers.**

What are the installation guidelines?

Some local sewer agencies in King County approve separators in their areas, so requestors must first determine whether they will be working with the county. Before installing an oil/water separator, the sewer contractor should submit all plans to the local sewer utility or King County for review. Businesses will need a letter approving the design and allowing discharge of wastewater from the properly installed tank. When submitting plans, include the following information:

- Name and address of the facility, and the phone number and mailing address of the person legally responsible for operation and maintenance.
- Drawing of the oil/water separator with capacities and dimensions. The outlet to the sewer must have a sampling "T" installed. (See Figure 1.)

Coalescing Plate Separator (CPS)

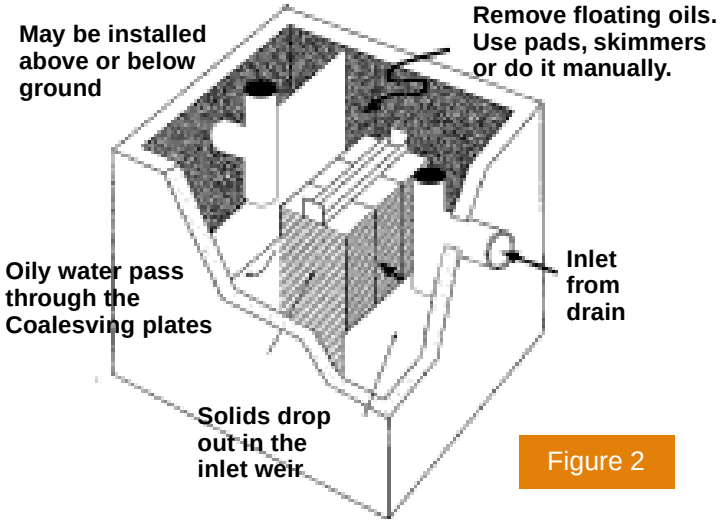

Figure 2

- Site map detailing all drains and the separator location. Indicate if any drainage is from rainwater runoff; this should be kept to a maximum of 200 square feet. KCIW can make exceptions based on specific needs or situation.
- Location of the water sources and maximum water flows, in gallons per minute (gpm) from all potential service areas and equipment discharging to the oil/water separator.

King County has capacity guidelines for standard oil/water separators to hold the maximum discharge flow for 45 minutes, e.g., a 20-gpm flow would require a 900-gallon separator. For more information on specifications and approval, call KCIW at 206-263-3000.

API O/W separator

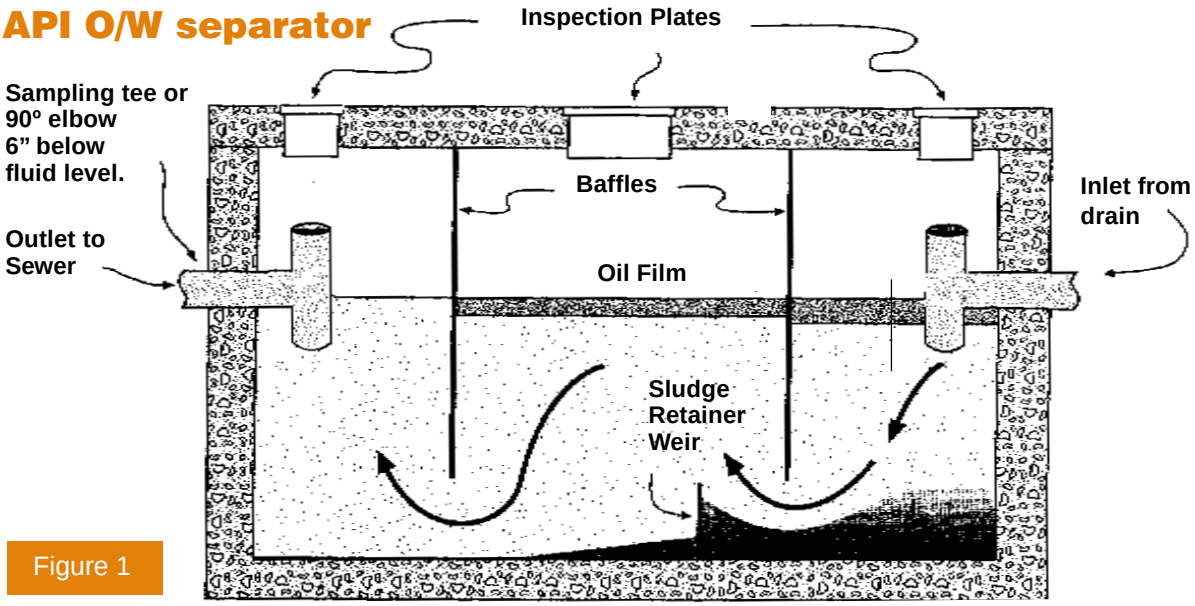

Figure 1

How do businesses inspect the O/W separator to know when it is dirty?

Many think that if it is still draining, it's working; but like any "filter" an O/W separator needs occasional cleaning. A separator's efficiency is most affected by settled solids or sludge and oils.

King County recommends that businesses inspect an O/W separator at least every six months. Steps to inspect are:

- Open the inspection plates with a screwdriver and look in each chamber. Make sure the outlet chamber (usually the side closest to the street) has a sampling "T." It should have at least a six-inch extension below the water surface.

- Take a long stick that will reach the bottom (about 8 feet). Any resistance in pushing through to the bottom will indicate a sludge buildup. Service the O/W separator when the buildup is about 8 inches deep in the inlet chamber (typically the one closest to the drain).
- Measure oil floating on top of the water. When there are two inches or more of oil in any chamber, it should be removed. Older oil has a chance of becoming emulsified.
- For coalescing plate separators, it is critical to remove and clean the plates before they get "blinded" or coated with silt or solids. This will allow oils to pass through to the sewer, possibly exceeding King County's discharge limits of 100 parts per million (ppm) for nonpolar Fats, Oils, and Grease (FOG).

Who do businesses call to clean out an O/W separator?

There are firms that specialize in pumping out and cleaning O/W separators. The phone book "yellow pages," for instance, lists these companies under "Tanks – Cleaning." These firms have special vacuum trucks that pump out materials with the consistency of anything from liquid slurry to solid dirt. The bulk liquid is shipped to a licensed treatment facility where the oils, solids and heavy metals are treated and removed from the water before being discharged to the sewer.

Businesses should never use a septic tank service to clean their O/W separators or catch basins.

Since vendors may have different requirements and/or treatment methods, costs could vary. Fees can include:

- **Lab analysis from a sample of the separator's contents**
- **Wastewater disposal charges**

How do businesses choose a tank-cleaning company?

Businesses should choose a reliable vendor by making sure that its equipment is right for the situation. Some equipment requires that incoming sludge to be a pumpable slurry. A lot of water may be needed to break up compacted sludge and to rinse out the truck's tank at the treatment facility. Both steps will involve extra time and expense.

Make sure the vendor vacuums out all of the sludge in each chamber. **Businesses should inspect and then fill up the separator with clean water before they begin discharging.**

What should and should not go through a separator?

- Antifreeze, degreasers, and detergents will emulsify (break up) oil into small droplets so the oil doesn't float to the surface.
- Fuels, alcohols or solvents not only can emulsify oil, but accumulated vapors can pose a threat to line workers at the pump stations or treatment plant.
- Concentrated amounts of oily products can overload the baffles or plates and pass through to the sewer.

The smaller capacity of coalescing units may have more turbulent flows. This "flushing" action, combined with a concentration of any emulsifier, can wash off the residual oils clinging to plates

Floating oils that are not skimmed from the surface of the separator will eventually become emulsified and appear to have a lighter color. Any use of emulsifiers could result in a violation of King County's nonpolar FOG (Fats, Oils, and Grease) limits of 100 ppm (equivalent to one teaspoon of oil to13 gallons of water!).

O/W separators are not designed to treat heavy metal-bearing wastewater. This type of discharge will require chemical treatment or special equipment for an acceptable discharge. Some potential examples of heavy metal-bearing wastewater:

- **Hot tank and cabinet washer solutions from auto repair or machine shops**
- **Pressure-wash water from ship and boat yards**
- **ANY metal finishing, plating or metal recovery water**
- **Water-soluble machine coolant**

What can businesses do to maintain their oil/water separators?

Businesses can save maintenance costs by diverting oils and sludge out of their separators. The sooner oils are removed, the less the chance they will become emulsified. Oils that are free-floating should be carefully pumped out. Businesses should store this oil in a separate drum and consult their vendors on how to properly dispose of it. Cleaners may contain certain chemicals that, when mixed with the oil, could make it a hazardous waste.

Another way to remove oil is to use absorbent pads or socks, which float on top of the water and attract only oil. Place the pads in the inlet chamber to trap the oils before the they get a chance to migrate. Remove the pads often before they are saturated. These pads can be wrung out and reused if handled properly. Absorbent products are available at most chemical and safety supply stores.

Sludge is oily dirt that builds up on the bottom of the separator. Sludges are expensive to dispose of and difficult to clean out. A catch basin, installed before the separator, can be shoveled out and will trap solids before they wash into the separator (Figure 3). This can be very helpful to businesses cleaning muddy equipment.

Catch Basin
for high dirt/sludge discharges
Install before the separator

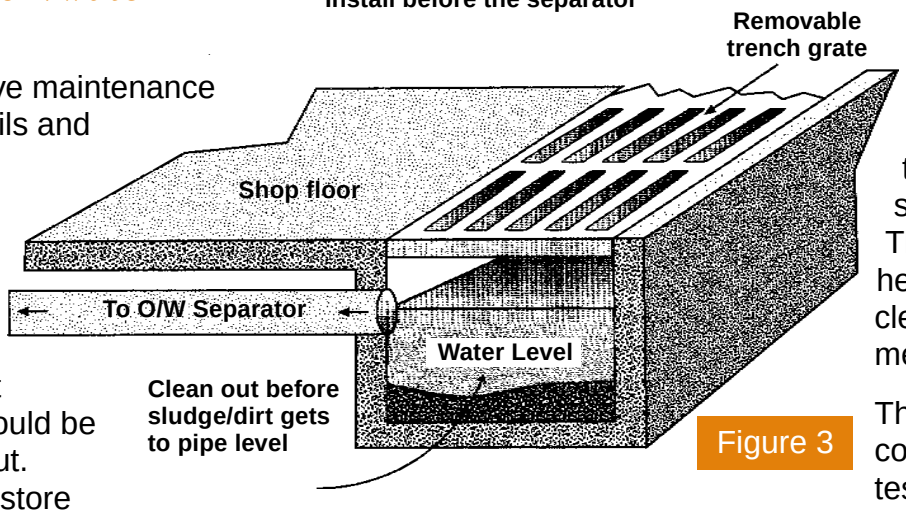

Figure 3

The sludge should be collected in a drum and tested to determine proper disposal methods. Sludges and other wastes may not be considered "hazardous wastes," but they may not be acceptable for garbage disposal.

For further information:

For information on solid waste disposal guidelines, call King County Waste Characterization at 206-296-4633.

For information on Fats, Oils and Grease (FOG), go to the KCIW Internet page at: **http://dnr.metrokc.gov/wlr/indwaste/fog.htm,** or use the contact information below.

For additional copies of this fact sheet, download from the KCIW Internet page at: **http://dnr.metrokc.gov/wlr/indwaste/oilfact.htm** or call the contact information below for hard copies.

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